

IN THE CLAIMS

Please amend the claims as follows:

1. (AMENDED) A fuel cell comprising:

at least one hydrogen electrode pair in contact with a hydrogen stream;

at least one oxygen electrode pair in contact with an oxygen containing stream;

at least one electrolyte chamber, wherein said electrolyte chamber provides mechanical support within said fuel cell and provides a ~~an uninterrupted~~ pathway for an electrolyte solution to contact said hydrogen electrode pair and said oxygen electrode pair; and

at least one compression plate.

2. (ORIGINAL) The fuel cell according to claim 1, wherein said electrolyte chamber comprises a porous support structure disposed between a pair of membranes.

3. (ORIGINAL) The fuel cell according to claim 2, wherein said porous support structure is comprised of an expanded polymer sheet.

4. (ORIGINAL) The fuel cell according to claim 3, wherein said expanded polymer sheet is comprised of a polyolefin.

5. (ORIGINAL) The fuel cell according to claim 4, wherein said electrolyte chamber contacts an electrolyte contacting surface of said hydrogen electrode pair and said oxygen electrode pair.

6. (ORIGINAL) The fuel cell according to claim 5, wherein said membrane prevents excess electrolyte solution from contacting said hydrogen electrode pair and said oxygen electrode pair.

7. (AMENDED) The fuel cell according to claim 6, wherein said membrane prevents said oxygen containing stream and said hydrogen stream from penetrating into said electrolyte.

8. (ORIGINAL) The fuel cell according to claim 1, wherein said hydrogen electrode pair comprises an anode active material having hydrogen storage capacity.

9. (ORIGINAL) The fuel cell according to claim 8, wherein said hydrogen electrode pair comprises a hydrogen inlet and a hydrogen outlet.

10. (CANCELED)

11. (AMENDED) The fuel cell according to claim 10, wherein at least one of the ~~said first and second~~ hydrogen electrode

electrodes of said hydrogen electrode pair have a hydrogen contacting surface, an electrolyte solution contacting surface, and a bulk of said active anode material.

12. (ORIGINAL) The fuel cell according to claim 11, wherein said bulk of said anode active material is disposed between said hydrogen contacting surface and said electrolyte contacting surface.

13. (ORIGINAL) The fuel cell according to claim 12, wherein said hydrogen contacting surface is adapted to dissociate and adsorb gaseous hydrogen.

14. (ORIGINAL) The fuel cell according to claim 13, wherein said bulk of said anode active material is adapted to store said adsorbed hydrogen.

15. (ORIGINAL) The fuel cell according to claim 14, wherein said electrolyte contacting surface is adapted to react said stored hydrogen with an electrolyte solution.

16. (AMENDED) The fuel cell according to claim 15, wherein at least one of the ~~said first and second~~ hydrogen electrodes of

said hydrogen electrode pair have a plurality of channels depressed into said hydrogen contacting surface.

17. (ORIGINAL) The fuel cell according to claim 16, wherein said channels extend vertically and horizontally across said hydrogen contacting surface.

18. (AMENDED) The fuel cell according to claim 17, wherein said hydrogen contacting surfaces of ~~said first and second~~ the hydrogen electrodes of said hydrogen electrode pair are adjacently disposed and said plurality of channels line up to form a series of hydrogen flow channels between ~~said first and second~~ the hydrogen electrodes of said hydrogen electrode pair.

19. (AMENDED) The fuel cell according to claim 18, wherein ~~said~~ the hydrogen electrodes of said hydrogen electrode pair have a deep channel on said hydrogen contacting surface extending vertically along each edge of ~~said first and second~~ each of the hydrogen electrodes.

20. (AMENDED) The fuel cell according to claim 19, wherein said deep channels form a manifold when said hydrogen contacting surfaces of ~~said first and second~~ the hydrogen electrodes of said hydrogen electrode pair are adjacently disposed.

21. (ORIGINAL) The fuel cell according to claim 20, wherein said deep channels have a conductive backing.

22. (ORIGINAL) The fuel cell according to claim 21, wherein said conductive backing is nickel.

23. (ORIGINAL) The fuel cell according to claim 21, wherein said conductive backing is adapted to collect an electrical current.

24. (ORIGINAL) The fuel cell according to claim 23, wherein said conductive backing is electrically connected to said anode active material.

25. (ORIGINAL) The fuel cell according to claim 20, wherein said manifold distributes hydrogen to said plurality of channels.

26. (AMENDED) The fuel cell according to claim 15, wherein a porous sheet is disposed between ~~said first and second~~ the hydrogen electrodes of said hydrogen electrode pair, wherein said sheet is adapted to allow a stream of hydrogen to flow across ~~said~~ the hydrogen electrodes while maintaining mechanical support within said fuel cell.

27. (AMENDED) The fuel cell according to claim 10, wherein ~~said first and second~~ at least one of the hydrogen electrode electrodes of said hydrogen electrode pair comprise an anode active material layer, a porous polytetrafluoroethylene layer, and a current collector grid.

28. (ORIGINAL) The fuel cell according to claim 27, wherein said anode active material layer is disposed between said current collector grid and said polytetrafluoroethylene layer.

29. (ORIGINAL) The fuel cell according to claim 28, wherein said anode active material layer is dispersed throughout said current collector grid.

30. (ORIGINAL) The fuel cell according to claim 27, wherein said anode active material layer comprises a mixture of mischmetal nickel alloy, raney nickel, graphite, and polytetrafluoroethylene powder.

31. (ORIGINAL) The fuel cell according to claim 30, wherein said anode active material layer has the following composition:

35 weight percent mischmetal nickel alloy,

46 weight percent raney nickel,

4 weight percent graphite, and

15 weight percent polytetrafluoroethylene powder.

32. (ORIGINAL) The fuel cell according to claim 27, wherein said current collector grid comprises at least one selected from the group consisting of mesh, grid, matte, expanded metal, foil, foam and plate.

33. (ORIGINAL) The fuel cell according to claim 32, wherein said current collector grid is comprised of a conductive metal.

34. (ORIGINAL) The fuel cell according to claim 33, wherein said conductive metal is nickel.

35. (ORIGINAL) The fuel cell according to claim 1, wherein said oxygen electrode pair comprises a cathode active material.

36. (ORIGINAL) The fuel cell according to claim 35, wherein said oxygen electrode pair comprises an oxygen inlet and an oxygen outlet.

37. (CANCELED)

38. (AMENDED) The fuel cell according to claim 37, wherein ~~said first and second~~ at least one of the oxygen electrodes of said

oxygen electrode pair ~~electrode~~ have an oxygen contacting surface, an electrolyte solution contacting surface, and a bulk of said cathode active material.

39. (ORIGINAL) The fuel cell according to claim 38, wherein said bulk of said cathode active material is disposed between said oxygen contacting surface and said electrolyte contacting surface.

40. (ORIGINAL) The fuel cell according to claim 39, wherein said oxygen contacting surface is adapted to dissociate and adsorb gaseous oxygen.

41. (ORIGINAL) The fuel cell according to claim 40, wherein said bulk of said cathode active material is adapted to store said adsorbed oxygen.

42. (ORIGINAL) The fuel cell according to claim 41, wherein said electrolyte contacting surface is adapted to react said stored oxygen with an electrolyte solution.

43. (AMENDED) The fuel cell according to claim 42, wherein ~~said first and second~~ the oxygen electrodes of said oxygen electrode pair have a plurality of channels having a wave configuration depressed into said oxygen contacting surface.

44. (ORIGINAL) The fuel cell according to claim 43, wherein said channels extend horizontally across said oxygen contacting surface.

45. (AMENDED) The fuel cell according to claim 44, wherein said oxygen contacting surfaces of ~~said first and second~~ the oxygen electrodes of said oxygen electrode pair are adjacently disposed and said plurality of channels line up to form a series of oxygen flow channels between ~~said first and second~~ the oxygen electrodes.

46. (AMENDED) The fuel cell according to claim 45, wherein ~~said~~ the oxygen electrodes of said oxygen electrode pair have a deep channel on said oxygen contacting surface extending vertically along each edge of ~~said first and second~~ the oxygen electrodes.

47. (AMENDED) The fuel cell according to claim 46, wherein said deep channels form a manifold when said oxygen contacting surfaces of ~~said first and second~~ the oxygen electrodes of said oxygen electrode pair are adjacently disposed.

48. (ORIGINAL) The fuel cell according to claim 47, wherein said deep channels have a conductive backing.

49. (ORIGINAL) The fuel cell according to claim 48, wherein said conductive backing is nickel.

50. (ORIGINAL) The fuel cell according to claim 48, wherein said conductive backing is adapted to collect an electrical current.

51. (ORIGINAL) The fuel cell according to claim 50, wherein said conductive backing is electrically connected to said cathode active material.

52. (ORIGINAL) The fuel cell according to claim 47, wherein said manifold distributes oxygen to said series of channels.

53. (AMENDED) The fuel cell according to claim 42, wherein a porous sheet is disposed between ~~said first and second~~ the hydrogen electrodes of said hydrogen pair, wherein said sheet is adapted to allow a stream of hydrogen to flow across said hydrogen electrodes while maintaining mechanical support within said fuel cell.

54. (AMENDED) The fuel cell according to claim 37, wherein ~~said first and second~~ at least one of the oxygen electrodes of said oxygen electrode pair comprise a gas diffusion layer, a catalyst

layer, a polytetrafluoroethylene layer, and a current collector grid.

55. (ORIGINAL) The fuel cell according to claim 54, wherein said catalyst layer is disposed between said gas diffusion layer and said current collector grid.

56. (ORIGINAL) The fuel cell according to claim 55, wherein said gas diffusion layer is disposed between said catalyst layer and said polytetrafluoroethylene layer.

57. (AMENDED) The fuel cell according to claim 56, wherein said polytetrafluoroethylene layer is in intimate contact with said oxygen containing stream.

58. (ORIGINAL) The fuel cell according to claim 57, wherein said catalyst layer is dispersed throughout said current collector grid.

59. (ORIGINAL) The fuel cell according to claim 58, wherein said current collector grid is in intimate contact with said electrolyte stream.

60. (ORIGINAL) The fuel cell according to claim 59, wherein said current collector comprises at least one selected from the group consisting of mesh, grid, matte, expanded metal, foil, foam and plate.

61. (ORIGINAL) The fuel cell according to claim 60, wherein said current collector grid is comprised of nickel.

62. (ORIGINAL) The fuel cell according to claim 61, wherein said gas diffusion layer has the following composition:

40 weight percent polytetrafluoroethylene;
60 weight percent carbon black.

63. (ORIGINAL) The fuel cell according to claim 62, wherein said catalyst layer has the following composition:

50 weight percent of a mixture by weight of 40 percent
5 polytetrafluoroethylene and 60 percent carbon black,
15 weight percent carbon black;
15 weight percent graphite;
20 weight percent silver oxide.

64. (ORIGINAL) The fuel cell according to claim 63, wherein said silver oxide contains a lithium aluminum alloy.

65. (ORIGINAL) The fuel cell according to claim 64, wherein said silver oxide contains gallium.

66. (ORIGINAL) The fuel cell according to claim 1, wherein said compression plate is adapted to absorb expansion of said hydrogen electrode pair and said oxygen electrode pair.

67. (ORIGINAL) The fuel cell according to claim 66, wherein said compression plate provides mechanical support within said fuel cell.

68. (ORIGINAL) The fuel cell according to claim 67, wherein said compression plate is comprised of rubber.

69. (ORIGINAL) The fuel cell according to claim 1, wherein said electrolyte solution is comprised of a potassium hydroxide solution.

70. (AMENDED) The fuel cell according to claim 1, wherein said oxygen containing stream comprises air.

71. (ORIGINAL) The fuel cell according to claim 1, wherein said hydrogen stream comprises gaseous hydrogen.

72-79. (CANCELED)